

**A METHOD FOR ELECTROPLATING A BODY-CENTERED  
CUBIC NICKEL-IRON ALLOY THIN FILM WITH A  
HIGH SATURATION FLUX DENSITY**

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**ABSTRACT OF THE DISCLOSURE**

A process for electroplating and annealing thin-films of nickel-iron alloys having from 63% to 81% iron content by weight to produce pole pieces having saturation flux density ( $B_s$ ) in the range from 1.9 to 2.3 T (19 to 23 kG) with acceptable magnetic anisotropy and magnetostriction and a coercivity ( $H_C$ ) no higher than 160 A/m (2 Oe). The desired alloy layer properties, including small crystal size and minimal impurity inclusions, can be produced by including higher relative levels of  $Fe^{++}$  ions in the electroplating bath while holding the bath at a lower temperature while plating from a suitable seed layer. The resulting alloy layer adopts a small crystal size (BCC) without significant inclusion of impurities, which advantageously permits annealing to an acceptable  $H_C$  while retaining the high  $B_s$  desired.

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